



COLLEGE CODE: 9509

COLLEGE NAME: HOLYCROSS ENGINEERING COLLEGE

**DEPARTMENT:CSE** 

STUDENT NM-ID:DE8B5C52E5439E988CD41EC9E8F50477

Roll No:950923104060

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Completed the project named as Phase 2

TECHNOLOGY PROJECT NAME:IBM-FE-Live Weather Dashboard Submitted by,

Name:Yogalakshmi M Mobile No:9342830545

### 1. Tech Stack Selection

#### Frontend:

- Framework/Library: React.js (for component-based UI)
- Styling: Tailwind CSS (lightweight, responsive styling)
- Visualization: Chart.js / Recharts (for weather trend graphs)

#### **Backend:**

- Server: Node.js + Express (API integration & routing)
- Weather API: OpenWeatherMap / WeatherAPI (real-time weather data)

Database: MongoDB (for storing user preferences, recent searches, caching data)

- Deployment & Others:
- Hosting: Vercel / Netlify (frontend), Heroku / AWS (backend)
- Version Control: Git + GitHub
- Authentication (optional): Firebase / JWT

### 2. UI Structure / API Schema Design

#### **UI Structure:**

```
Header/Navbar → App name, search bar, settings

Main Dashboard

Current weather card (temperature, location, icon)

Weather details (humidity, pressure, wind speed, sunrise/sunset)

Forecast section (next 5 days)

Graph (temperature trend, rain probability)

Sidebar/Settings → Units (C/F), theme switcher, saved locations

API Schema:
```

```
"location": "Chennai",

"coordinates": { "lat": 13.0827, "lon": 80.2707 },

"current": {

"temperature": 30,

"humidity": 78,

"pressure": 1012,

"wind_speed": 4.5,

"weather": "Cloudy",

"icon": "04d"

},

"forecast": [

{ "date": "2025-09-15", "temp": 29, "weather": "Rainy" },

{ "date": "2025-09-16", "temp": 31, "weather": "Sunny" }

]
```

# 3. Data Handling Approach

- Fetch weather data via REST API calls.
- Cache frequently used locations in MongoDB to reduce API calls.
- Transform API data into normalized format before rendering.

- Error Handling: Show fallback message if API fails (e.g., "Unable to load weather data").
- State Management: React Context API / Redux for global state (selected city, theme, units).

# 4. Component / Module Diagram

### **Components:**

App → Root container

Navbar → Search + settings

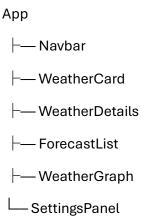
WeatherCard → Current weather

WeatherDetails → Humidity, pressure, wind

ForecastList → 5-day forecast

WeatherGraph → Trend visualization

SettingsPanel → Theme, units



# 5. Basic Flow Diagram

```
User → Search City → API Call (Weather API)

↓

Backend (Node.js) → Cache/DB Check → Fetch if not available

↓

Process Data → Send Response

↓
```

Frontend (React) → Update State → Render Dashboard